

MDA Horticulture Fund 2005

Final Progress Report

1. **Project Title:**

**Evaluation of disease and insect resistant elm hybrids and selections
for the Michigan climate**

2. **Project MDAH #:**

3. **Principal Investigator(s):** Gerard C. Adams, MSU Dept. Plant Pathology gadams@msu.edu

4. **Reporting period:** FY-05, June 2005-June 30, 2006

5. **Accomplishments during reporting period:**

Fourteen of 16 elm cultivars were received from J.F. Schmidt and Son Co).

Nursery and five trees of each (70 trees) were planted, positioned using a random numbers table, in late spring 2005 at the MSU Plant Pathology Farm. Ten random spaces remain for two additional cultivars. These are listed below in the table.

A drip irrigation system with two emitters per tree was purchased from Shield's Irrigation to deliver well-water during establishment. The site was characterized for slope, aspect and location. The site has a SE slope measured at 4° and is positioned, using WAAS GPS, at N42°41.236' latitude, W084°28.274' longitude. Soil type is Capac loam edged with Riddley-Hillsdale sandy loam. The field had been fallow since 1999. Weed control was by mowing except one application of herbicide to create a weed barrier around each tree of Roundup at 2qt/acre and Surflan for residual at 1qt/acre.

By autumn, it was determined that the 5 trees of 'Emer II Allen' had arrived dead. Three trees of 'Morton Glossy' Triumph' died during establishment. Replacement trees were ordered for spring 2006. The site is windy and 2/5 trees of 'Harmony' broke well above the graft union. This cultivar was determined to have brittle wood. To establish trees with straight orientation two conduit pipes were positioned around each tree and plastic tree tape used for support trunks. Trunks were protected with 4 ft guards to prevent sunscald, deer and winter rabbit damage. Poison bait was used to protect trees from winter vole damage.

Several cultivars showed very late bud break and records were taken, but due to the stresses of establishment, bud break data will not be considered relevant until summer of 2006. Heavy Japanese Beetle attack affected several cultivars and susceptibility was briefly recorded, then a pesticide treatment was applied to prevent loss of trees with late bud break. Guaranteeing establishment was given higher priority than insect resistance ratings for 2005. Susceptibility to Japanese Beetle will be a primary measurement for 2006. Below are two views documenting establishment of the elm cultivar planting in early summer 2006.



Table of Cultivars planted in 2005-2006. 'Emer II' Allee arrived dead and will not be replaced.

#	Cultivar	Species*
1	"Clone D"	<i>U. pronoiaua</i>
2	'Emer II' Allee	<i>U. parvifolia</i>
3	'Frontier'	<i>U. carpinifolia</i> X <i>U. parvifolia</i>
4	'Homestead'	<i>U. glabra</i> X <i>U. carpinifolia</i> X <i>U. pumila</i>
5	'Morton Glossy' Triumph	<i>U. pumila</i> X <i>U. japonica</i> X <i>U. wilsoniana</i>
6	'Morton Plainsman' Vanguard	<i>U. pumila</i> X <i>U. japonica</i>
7	'Morton Red Tip'	<i>U. pumila</i> X <i>U. japonica</i> X <i>U. wilsoniana</i>
8	'Morton Stalwart' Commendation	<i>U. carpinifolia</i> X <i>U. pumila</i> X <i>U. wilsoniana</i>
9	'Morton' Accolade	<i>U. japonica</i> X <i>U. wilsoniana</i>
10	'New Horizon'	<i>U. pumila</i> X <i>U. japonica</i>
11	'Patriot'	<i>U. glabra</i> X <i>U. carpinifolia</i> X <i>U. pumila</i>
12	'Pioneer'	<i>U. glabra</i> X <i>U. carpinifolia</i>
13	'Prospector'	<i>U. wilsoniana</i>
14	'Valley Forge'	<i>U. americana</i>
15	'Princeton'	<i>U. americana</i>
16.	'New Harmony'	<i>U. americana</i>

In spring of 2006 replacement trees were planted, including three of *U. pumila* X *U. japonica* X *U. wilsoniana* 'Morton Glossy Triumph', one *U. carpinifolia* X *U. parvifolia* 'Frontier' and one *U. glabra* X *U. carpinifolia* X *U. pumila* 'Homestead' were planted in early spring. *U. parvifolia* 'Emer II Allee' were not replaced and are now excluded from the trial. Two additional cultivars, *U. americana* 'Princeton' and *U. americana* 'New Harmony' (10 trees) were randomly planted in the trial. Weed barrier and bark mulch was applied around each tree. Assessment of tree form and growth was measured after bud break and recorded. Data on tree assessments are appended to this report.

6. Planned activities for next reporting period:

Assessment of trees for susceptibility to Japanese beetle will be the main activity following spring for 2006. MSU Elm Trial data will be linked to data from other states on a common website. Additional replacement trees will be ordered and planted. Color pictures of mature samples of the cultivars will be collected and used in assembling a descriptive bulletin for the public.

7. Other funding or contributions related to project:

Grant proposals will be written and submitted by spring deadlines to International Society of Arboriculture and the Horticultural Research Institute.

8. Publications/ outreach activities related to project:

An article will be written and submitted to the *Landscaper* or similar Michigan magazine that will introduce the elm cultivar trial to the Michigan nursery industry in 2006. Extension bulletins from Colorado State University that feature photographs and descriptions of Dutch Elm Disease resistant elm cultivars will be purchased and distributed to: 1). interested members of the public during MSU campus field tours in 2006, and 2) 50 MSU students majoring in horticulture and forestry during the PLP/ENT 407 campus course in 2006.

Fifty MSU students will be driven to the Elm trial location and will receive a detailed discussion of the trial's purpose, the history of the cultivars, and the current results of performance evaluations. If possible, the MNLA field tours of campus will be directed to the trials for a similar presentation by the PI.

National Elm Trial
2005

Site Number 06		Latitude (Decimal Degrees) 42.687267	Longitude (Decimal Degrees) 84.471233 WAAS	Elevation (Feet) 888
Research Institute MICHIGAN STATE UNIVERSITY				
Research Area Plant Pathology Research Farm, MSU		Slope (Percent) 4.8%	Aspect (Degrees) 150	Soil Type (1-5) 3
State MI	City East Lansing 48824			
<p>Additional Information Soil Type is primarily CAPAC loam with outcroppings of Riddley-Hillsdale sandy loam. The latter soil series is primarily on the eastern edge, columns 1--3. Drip irrigation with two emitters was set up for establishment and used in 2005 and 2006. Japanese beetle and very late bud-break resulted in death of two 'Valley Forge', after replacements were ordered. Trees had to be staked with two 7' high east/west aluminum poles [10' conduit pipe] because high winds snapped two 'Emerald Sunshine'. All 'Emer II Allee' were dead on arrival and not replaced. 'Princeton' and 'New Harmony' were planted in 2006. Trees were sprayed for Japanese beetle in 2005 to prevent death.</p>				

**National Elm Trial
2005**

Site Number	Planting Date (mm/dd/yy)	Block Number	Row Number	Column Number	Tree Map Number (1-14)	Cultivar Number (1-14)	Tree Number	DBH @ Planting (inches in tenths)	Height @ Planting (feet in tenths)	Crown width	Crown shape
6	5/6/2005	1	1	1	3	10	1-1-1-10	19	9	2.4	vase
6	5/6/2005	1	1	2	6	5	1-1-2-5	13	9.3	0.9	-
6	5/6/2005	1	1	3	7	13	1-1-3-13	20	8.4	5.6	vase
6	5/6/2005	1	1	4	4	1	1-1-4-1	5.5	3.3	2.6	vase
6	5/6/2005	1	1	5	9	14	1-1-5-14	11	9.3	0	-
6	5/6/2005	1	1	6	5	11	1-1-6-11	23	10	5	vase
6	5/9/2006	1	1	7	16	16	1-1-7-16	15	6.4	0.9	-
6	5/6/2005	1	1	9	10	6	1-1-9-6	23.3	11	4.5	vase
6	5/6/2005	1	1	10	14	9	1-1-10-9	16.3	7.9	2.9	vase
6	5/6/2005	1	2	1	2	3	1-2-1-3	9.6	6.5	2	-
6	5/6/2005	1	2	2	13	2	1-2-2-2	11	3	6	
6	5/9/2006	1	2	3	15	15	1-2-3-15	11	5.9	6	-
6	5/6/2005	1	2	4	8	8	1-2-4-8	27.2	12.6	6.7	vase
6	5/6/2005	1	2	5	11	12	1-2-5-12	19.1	10	3.8	vase
6	5/6/2005	1	2	6	1	4	1-2-6-4	14.4	10.3	4	vase
6	5/6/2005	1	2	7	12	7	1-2-7-7	21.5	10	6	vase

**National Elm Trial
2005**

Site Number	Planting Date (mm/dd/yy)	Block Number	Row Number	Column Number	Tree Map Number (1-14)	Cultivar Number (1-14)	Tree Number	DBH @ Planting (inches in tenths)	Height @ Planting (feet in tenths)	Crown width	Crown shape
6	4/28/2006	2	2	8	6	5	2-2-8-5	6.3	7.35	0.8	-
6	5/6/2005	2	2	9	11	12	2-2-9-12	13	8.6	1.9	-
6	5/6/2005	2	2	10	10	6	2-2-10-6	23.6	10	6.3	vase
6	5/9/2006	2	3	1	15	15	2-3-1-15	12.2	5.8	0.7	-
6	5/6/2005	2	3	3	2	3	2-3-3-3	16.2	9.5	4.4	vase
6	5/6/2005	2	3	4	7	13	2-3-4-13	19.4	10	5	vase
6	5/6/2005	2	3	5	14	9	2-3-5-9	20.4	11.6	6.5	vase
6	5/6/2005	2	3	6	1	4	2-3-6-4	18	11	3	vase
6	5/6/2005	2	3	7	3	10	2-3-7-10	24.4	11	2.8	vase
6	5/6/2005	2	3	8	9	14	2-3-8-14	10.1	8.5	4.3	vase
6	5/9/2006	2	3	9	16	16	2-3-9-16	11.7	6.3	0.8	-
6	5/6/2005	2	3	10	8	8	2-3-10-8	17.5	9	3.9	vase
6	5/6/2005	2	4	1	5	11	2-4-1-11	23.4	9.7	4.3	vase
6	5/6/2005	2	4	2	13	2	2-4-2-2	-	-	-	-
6	5/6/2005	2	4	3	12	7	2-4-3-7	25	11.6	5.5	vase
6	5/6/2005	2	4	4	4	1	2-4-4-1	0	2.7	1.8	

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6	5/6/2005	3	4	5	7	13	3-4-5-13	16.4	9	4.8	vase
6	5/6/2005	3	4	6	13	2	3-4-6-2	0.3	3	0.4	-
6	5/6/2005	3	4	7	14	9	3-4-7-9	18.2	8.6	3.5	vase
6	5/9/2006	3	4	8	15	15	3-4-8-15	12.7	5.8	0.6	-
6	4/28/2006	3	4	9	6	5	3-4-9-5	12.5	10	1.9	vase
6	5/9/2006	3	4	10	16	16	3-4-10-16	17	6.3	0.8	-
6	5/6/2005	3	5	1	3	10	3-5-1-10	22.2	10.6	4	vase
6	5/6/2005	3	5	3	2	3	3-5-3-3	15.5	10.3	4.5	vase
6	5/6/2005	3	5	4	5	11	3-5-4-11	18.3	12.6	3.2	vase
6	5/6/2005	3	5	5	9	14	3-5-5-14	17.2	10	3.5	-
6	5/6/2005	3	5	6	12	7	3-5-6-7	26.5	11	5	vase
6	5/6/2005	3	5	7	4	1	3-5-7-1	15	11	2	-
6	5/6/2005	3	5	8	1	4	3-5-8-4	16.3	10	3.3	vase
6	5/6/2005	3	5	9	8	8	3-5-9-8	-	-	-	-
6	5/6/2005	3	5	10	11	12	3-5-10-12	16.7	10	2.2	vase
6	5/6/2005	3	6	1	10	6	3-6-1-6	27.2	11	5.5	vase

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6	5/6/2005	4	6	2	10	6	4-6-2-6	24.4	12.6	4.4	vase
6	5/6/2005	4	6	3	6	5	4-6-3-5	26.6	13	3.3	vase
6	5/6/2005	4	6	4	9	14	4-6-4-14	16.4	10	0.3	-
6	5/6/2005	4	6	5	11	12	4-6-5-12	12.1	10	0.8	vase
6	4/28/2006	4	6	6	2	3	4-6-6-3	7.2	7.9	0.8	-
6	5/6/2005	4	6	7	14	9	4-6-7-9	16.3	8.6	3.1	vase
6	5/9/2006	4	6	8	15	15	4-6-8-15	11.5	6	0.6	-
6	5/6/2005	4	6	9	3	10	4-6-9-10	20.6	9	1.6	vase
6	5/6/2005	4	6	10	1	4	4-6-10-4	12.3	10	2	vase
6	5/6/2005	4	7	3	8	8	4-7-3-8	25.5	11	5.3	vase
6	5/6/2005	4	7	4	7	13	4-7-4-13	22.6	10	4.6	vase
6	5/6/2005	4	7	5	13	2	4-7-5-2	-	-	-	-
6	5/6/2005	4	7	6	12	7	4-7-6-7	25.7	9.5	4.4	vase
6	5/6/2005	4	7	7	5	11	4-7-7-11	23	11	4.6	vase
6	5/9/2006	4	7	8	16	16	4-7-8-16	16.6	6.1	0.7	-
6	5/6/2005	4	7	10	4	1	4-7-10-1	17.5	9.4	2.5	vase

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2005**

Site Number	Planting Date (mm/dd/yy)	Block Number	Row Number	Column Number	Tree Map Number (1-14)	Cultivar Number (1-14)	Tree Number	DBH @ Planting (inches in tenths)	Height @ Planting (feet in tenths)	Crown width	Crown shape
6	5/6/2005	5	7	1	1	4	5-7-1-4	17	9.5	3.4	vase
6	5/9/2006	5	7	2	16	16	5-7-2-16	19	6.6	0.9	-
6	4/28/2006	5	8	1	6	5	5-8-1-5	0.55	7	0.7	vase
6	5/6/2005	5	8	2	4	1	5-8-2-1	17.7	10	2.8	vase
6	5/6/2005	5	8	3	10	6	5-8-3-6	26	11.5	4	vase
6	5/6/2005	5	8	4	12	7	5-8-4-7	18.4	11	4	vase
6	5/6/2005	5	8	5	13	2	5-8-5-2	0	5	0.9	vase
6	5/6/2005	5	8	6	11	12	5-8-6-12	12.9	9	-	-
6	5/6/2005	5	8	7	8	8	5-8-7-8	24	10.3	6.6	vase
6	5/6/2005	5	8	9	3	10	5-8-9-10	23.4	10	3.1	vase
6	5/6/2005	5	8	10	5	11	5-8-10-11	27.2	13	4	vase
6	5/9/2006	5	9	5	15	15	5-9-5-15	9.1	6.1	0.9	-
6	4/28/2006	5	9	6	1	4	5-9-6-4	16.3	10.6	2.8	vase
6	5/6/2005	5	9	7	2	3	5-9-7-3	21.3	10.6	3.5	vase
6	5/6/2005	5	9	8	14	9	5-9-8-9	17.7	8	4.4	vase
6	5/6/2005	5	9	9	9	14	5-9-9-14	15	10	3.8	-

National Elm Trial
2005

Site Number: 6		Total Monthly Precipitation	Monthly Average Temperature	Monthly Minimum Temperature	Monthly Maximum Temperature	Monthly Supplemental Irrigation	Average Precipitation By Month	Average Temperature By Month	Comments
Year	Month								
2005	1	2.65 in	21.35	13.6 F	29.1 F	0.00	1.56	21.00	
2005	2	1.77 in	27.25	19.60	34.90	0.00	1.39	23.50	
2005	3	0.62 in	30.30	21.10	39.50	0.00	2.12	33.50	
2005	4	0.78 in	49.25	36.90	61.60	0.00	3.27	45.50	
2005	5	1.31 in	53.50	42.10	64.90	2.00	2.68	57.00	drip irrigated twice for establishmen
2005	6	4.28 in	71.80	60.80	82.80	0.00	3.08	66.50	
2005	7	4.58 in	71.70	60.30	83.10	0.00	3	70.50	
2005	8	0.64 in	71.40	60.50	82.30	0.00	3.41	68.50	
2005	9	3.02 in	65.35	52.80	77.90	0.00	3.39	60.50	
2005	10	0.66 in	51.65	41.70	61.60	0.00	2.45	49.00	
2005	11	2.66 in	41.20	32.40	50.00	0.00	2.58	38.00	
2005	12	1.05 in	24.20	19.40	29.00	0.00	1.98	27.00	